MARKED-UP VERSION OF THE AMENDED CLAIMS

(Version with markings to show changes made)

28. (new) The device according to claim 11 wherein the first divergent light beams comprise incoherent light; and

wherein a direction of the first light beams reflected in the area of the front side (1.1) and rear side (1.2) of the transparent object (1) corresponds to a direction of incidence in the area of the front side (1.1) and rear side (1.2) of the transparent object (1)

of the reflected second parallel light beams being focused by the second objective (24).

REMARKS

Claims 1 through 27 continue to be in the case.

New claims 28 is being submitted.

New claim 28 is based on the specification, page 10, line 22 through page 11, line 2.

The Office Action refers to Claim Rejections - 35 USC § 103.

13. Claims 1-8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Spengler et al (US 5.636,027) in view of Takamasa (JP 58022902) and further in view of what is commonly known in the art.

Spengler et al (Spengler hereinafter) discloses a method and apparatus comprising all the claim limitations (see col.3, line 36- col.4, line 10, Figure 1) except the use of lasers as a light sources instead of applicants use of "light surfaces", and the use of lenses for shaping the light beams, for the purpose of making contactless measurement of the thickness of an object made of transparent material.

As to Spengler it is noted that the whole reference does not teach or suggest to employ a single lens or objective, whereas the claims of the present application clearly require various such elements. It is further noted that the Spengler reference is incapable of measuring a thickness of grained, uneven container glass without the objectives and lenses of the instant application. Thus, Spengler clearly does not direct to the device and to the method of the present invention nor does Spengler suggest reliable measurements at grained, uneven container glass.

Takamasa discloses the use of lenses 3, 7 (see Figure) for shaping the light beams, for the purpose of making contactless measurement of the thickness of an object made of transparent material. Also, the use of various

types of light sources for the purpose of making contactless measurement of the thickness of an object made of transparent material is commonly known in the art.

In view of Takamasa' teachings and what is commonly known in the art, according to the Office Action it would have been obvious to one of ordinary skills in the art at the time the invention was made to incorporate refractive elements such as lenses for beam shaping and provide alternate/substitute light sources into Spengler's apparatus/method for making contactless measurement of the thickness of an object made of transparent material. Accordingly, such incorporation/substitution would have constituted an alternative means/obvious engineering expedience for one of ordinary skill in the art.

Applicant respectfully urges that the combination of the references Spengler and Takamasa is not a proper combination of Spengler and Takamasa. A person of ordinary skill in the art would like to save some money and would replace the presumably relatively expensive linear sensors 16 and 26 of Spengler, column 3, lines 46 through 51 by the rotary mirrors (10, 10') and the cheap detectors 5, 5' of Takamasa.

It is noted in this context that the device of the present application has sensors (16, 26), which measure distances of light reflexes. In clear contrast, Takamasa teaches to measure time sequences of incidence of laser light. Thus the light incidence position resolving and opto-electronic receives (16, 26) of the applicant are clearly different from the elements (5, 5') of Takamasa.

Applicant further urges that there is no motivation in Spengler and/or Takamasa to do what the applicant did since the references were not faced with the problem of furnishing a reliable measurement of grained, uneven surfaces of container glass and a requirement of avoiding measurement errors based on a wedge shape of the container glass wall (applicant's specification, page 7, lines 14 through 17). Thus there is no suggestion in the references regarding any combination of the references regarding a measurement system suitable for grained, uneven container glass.

Furthermore it is noted that the lens 7 of Takamasa is a cylindrical lens, that is a light dispersing lens. In contrast, all lenses and objectives forming part of the present invention are light collecting lenses or objectives. Thus the teaching of a cylindrical and light dispersing lens 7 by Takamasa is clearly leading away from the present invention.

The Office Action states under 13. that the method and the device for the contactless measurement of the wall thickness according to the present invention are taught in the United States patent 5,636,027 and in the Japanese patent 58,022,902. Furthermore the Office Action alleges that the Japanese patent reference to Takamasa teaches the use of lenses for beam forming.

It can be recognized that the lens 7 of the Japanese patent reference is a cylindrical lens and thus no expansion, collimation, or focusing of the beam is performed in the sense of the present application, but instead only a pulling apart of the laser beam to form a line is obtained.

An essential feature of distinction of the present application relative to the Japanese patent reference comprises that the Japanese patent reference teaching lacks a further lens, which further lens focuses the expanded beam onto the measurement object, which is performed in the construction of the applicants with the lenses 14 and 24.

This cylinder lens 7 of the Japanese patent reference performs a beam dispersion only in one direction for deforming the point shaped laser beam of the He-Ne-laser light source 2 into a line. This accomplishes that based on the line shaped beam instead of a point shaped beam also curved surfaces, for example TV panels, also parts of the reflections of the laser light line can impinge into the receiving optics 3 and 3' of the reference Takamasa.

It can be recognized that a pulling a part of the laser point to a line with a cylindrical lens 7 does in no way achieve the property of a diffuse irradiating illuminating surface as expressly recited in claim 1 of the present application.

The illuminating face 11 employed according to the present Invention emits light bundles in many different emerging directions like a two dimensional surface. These light bundles are expanded by the lens 12, are deflected by the semipermeable mirror 13 and are focused downstream onto the measurement object through the lens 14. Thus light bundles out of the most different directions fall onto the measurement object. An image of the illuminating face 11 is thereby generated on the measurement object. Thus

an illuminating measurement surface is generated on the measurement object. This illuminating measurement surface generates in turn reflections at the front side and at the backside of the measurement object. These reflections are imaged on the line sensor 26 by way of the two objectives 15 and 25. The objectives 15 and 25 generate an image on the line sensor 26 from the reflections.

It can be recognized that all teachings presented in the references of the state-of-the-art and the further teachings recited in the office action do not present an image of light sources onto the measurement object and also no image of the container glass reflections on the light sensitive sensor. The known teachings of the references deliver a laser beam on the surface of the measurement object and receive the reflections directly on the light sensitive sensor without providing images of the reflections.

In order to explain the difference in more detail three sketches designated as figure 2, figure 3, and figure 4 are provided.

Figure 2 shows the base principal of the references applied. The sharp laser beam is directed immediately to the measurement object. The reflections at

the front side and at the backside of the measurement object of the beam fall immediately onto the light sensitive sensor. A possibly intermediately disposed cylinder lens (a la Takamasa) on the side of the impinging beam as the described in the Japanese patent reference serves only for a pulling apart of the laser into a line with the purpose that parts of the reflected beam can still pass onto the light sensitive sensor even at curved surfaces.

Figure 3 shows that these constructions and arrangements are unsuitable for the typically rough and scarred surfaces of container glass. The fine unevenness of the surface leads to the situation that a sharply bungled laser beam will be deflected at the surface such that the reflected light mostly will not reach the sensor.

Finally figure 4 shows the base principal of the present invention: the diffuse radiating illuminating surface sends off bundles of light in the most different directions. The light bundles are directed initially through the objective 1 and then through the objective 2 onto the measurement object. An image of the illuminating face is thereby generated on the surface of the measurement object, wherein the image of the illuminating face in turn emits beam bundles in most different directions. Even then, where the surface of the

measurement object is rough and in detail uneven and therewith parts of the impinging beam bundles are reflected in such directions, which directions are disposed outside of the receiving optics, there exist parts at the back reflected ray bundles, which can be imaged by the objectives 15 and 25 onto the light sensitive line sensor. Two images of the reflections are thereby generated on the line sensor even in case of uneven, rough surfaces of the measurement object, which enables a determination of the wall thickness of rough container glass.

Reconsideration of all outstanding rejections is respectfully requested.

Entry of the present amendment is respectfully requested. All claims as presently submitted are deemed to be in form for allowance and an early notice of allowance is earnestly solicited.

Respectfully submitted,

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